

Turning now to the merits, some background may be helpful in understanding embodiments of the present invention and its relationship to the applied references.

The treatment and/or analysis of blood vessel walls are complicated by the fact that the physical relationship between the optical probe, typically the probe head, and the blood vessel walls is poorly controlled. This problem arises because of blood flow, respiratory motion, and cardiac motion. Moreover the catheters are long, often extending from an incision in a femoral artery all the way to the patient's heart. Therefore mechanical activation to control the probe head-blood vessel wall distance is problematic unless a drastic approach such as using a balloon to occlude blood flow is employed.

As a result, the distance and also the amount of blood between the probe and the vessel walls varies over time and the contribution of the vessel walls to the collected information, such as spectra, varies correspondingly. Thus, in diagnostic applications, such as spectroscopy applications, the unknown pathlength will affect the degree to which the detected spectrum is dominated by unwanted signal sources, such as blood, thus making it difficult to isolate the spectral response of the vessel walls or other structures of interest.

Aspects of the invention are directed to the notion of: 1) analyzing the optical signals to determine whether the probe is close enough to the vessel walls and using the received optical signals to assess the vessel walls when the probe is determined to be close enough to the vessels walls to enable the assessment of the vessel walls and 2) analyzing the optical signals to determine whether the optical signals are indicative of the vessel walls and/or the intervening fluid; and initiating diagnosis or treatment of the vessel walls in response to the step of analyzing.

In summary, aspects of the invention include the notion of determining probe head-blood vessel wall distance using the optical signals and triggering analysis or treatment based on such distance.

Claims 1-27 and 29-64 were rejected under 35 U.S.C. 103(a) as being unpatentable over Auer *et al.* (US 5,383,467) in view of Narciso, Jr. (US 5,217,456). This rejection is respectfully traversed for the following reasons.

The pending Office Action acknowledges that the primary refers fails to suggest a key aspect of the present claimed invention. Specifically the pending Office Action at page 5 provides:

However, Auer et al do not disclose triggering an assessment of the vessel walls when a mechanical relationship has been determined or initiating diagnosis or treatment of the vessel walls in response to analyzing the optical signals indicative of a spectral response if the probe is determined to be close enough to the vessel walls to enable the diagnosis or treatment. In the same

The Office Action, however, does not assert that the secondary reference cures this defect in the teachings of the Auer Patent.

The Office Action merely recognizes that the Narciso patent describes functionality similar to embodiments of the claimed invention. Specifically, at page 5, the pending Office Action argues:

narrowing of the vessel. Thus, Narciso, Jr. teaches receiving optical signals from vessel walls through intervening blood, analyzing the signals to determine whether plaque (and subsequently whether the vessel is narrowing and the probe is closer to the vessel wall, and using the signals to diagnose the vessel walls as healthy or unhealthy.

In summary, while it is true that the Narciso patent describes fluorescence spectral analysis, there is no teaching in the Narciso patent to determine or assess probe head-blood vessel wall distance using the optical signals or trigger analysis based on such distance.

With this key teaching admitted not found in the primary reference and not present in the secondary reference there is no argument for the obviousness of the present claimed invention. In short, there are no teachings in the "Narciso, Jr. in order to alleviate the problem of not knowing the probe position in relation to the vessel wall", contrary to the assertion of the final paragraph on page 5 of the pending Office Action.

In summary, the present situation seems analogous to that in Litton Systems, Inc. v. Honeywell, Inc., 87 F.3d 1559 (Fed. Cir. 1996) in which the references simply do not contain many of the limitations in the claimed invention. See Litton at 1569. That is, among the applied references, only the present inventors have suggested to trigger analysis or treatment based on an optically determined distance to the vessel wall.

Thus, it is respectfully asserted that the pending claims are patentably distinguishable over the applied references.

It is believed that the present application is in condition for allowance. A Notice of Allowance is respectfully solicited. Should any questions arise, the Examiner is encouraged to contact the undersigned.

Respectfully submitted,

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